



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/762,678	01/20/2004	Andrew J. Ouderkirk	58388US004	5265
32692	7590	05/03/2005	EXAMINER	
3M INNOVATIVE PROPERTIES COMPANY			LOUIE, WAI SING	
PO BOX 33427			ART UNIT	
ST. PAUL, MN 55133-3427			PAPER NUMBER	
			2814	
DATE MAILED: 05/03/2005				

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/762,678

Applicant(s)

OUDEKIRK ET AL.

Examiner

Wai-Sing Louie

Art Unit

2814

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 18 April 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) 22 and 23 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-21 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>11/29/04</u> . | 6) <input type="checkbox"/> Other: _____  |

### DETAILED ACTION

Applicant's election with traverse of Group I, claims 1-21, in the reply filed on 4/18/05 is acknowledged. The invention of Group I is a semiconductor light-emitting device comprises a light-emitting device having a phosphor layer formed in a reflector and the invention of Group II is a method of illuminating phosphor. The Inventions Group I and Group II are related as process of making and product made and the inventions Group I and Group II belong to different classes, which require separate searches and considerations. The separate searches and considerations for each group would provide a burden on the examiner. As such, the restriction is proper and the restriction is final. It is suggested that non-elected claims 22-23 be canceled in the response to this Office Action.

### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-4, 6, 8-10, and 13 are rejected under 35 U.S.C. 102(b) as being anticipated by Lowery (US 5,959,316).

With regard to claims 1-2, Lowery discloses a phosphor-LED device (col. 2, line 3 to col. 3, line 47 and fig. 3) comprising:

- an LED 18 capable of emitting light (col. 2, lines 9-14 and fig. 3);
- a layer of phosphor material 52 positioned with excitation light and emitting visible light when illuminated with excitation light (col. 1, lines 18-26);
- interference reflector means 16 for reflecting at least some light emitted by the LED 18 that has not passed through the phosphor material (col. 2, lines 33-35 and fig. 3), onto the layer of phosphor material 52 and transmitting at least some visible light emitted by the phosphor 52 (fig. 3).

With regard to claim 3, Lowery discloses the layer of phosphor 52 has a major surface from which light is emitted toward an output end of the light source (fig. 3), and where the light emitted by the LED that has not pass through the layer of phosphor material 52 is reflected onto the major surface of the layer of phosphor material 52 (fig. 3).

With regard to claim 4, Lowery discloses the reflector 16 substantially reflects light emitted by the LED and substantially transmits light emitted by the phosphor material 52 (col. 1, lines 11-16).

With regard to claim 6, Lowery discloses the reflector 16 has a non-planar shape (fig. 3).

With regard to claim 8, Lowery discloses a first portion of the light emitted by the LED 18 is reflected onto a major surface of the phosphor layer 52 and a second portion of the light emitted by the LED 18 impinges on a second major surface of the layer of phosphor material 52 opposite to the first major surface (fig. 3).

With regard to claim 9, Lowery discloses the reflector 16 has the shape of a surface of revolution (fig. 3).

With regard to claim 10, Lowery discloses layer of phosphor material 66 surrounds the LED 60 (fig. 4).

With regard to claim 13, Lowery discloses the layer of phosphor material 66 is not coplanar with the LED 60 (fig. 4).

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 5 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lowery (US 5,959,316) in view of Chen (US 5,982,092).

With regard to claim 5, Lowery discloses the LED 60 is adhered onto the substrate 62, but does not disclose a reflector formed on the substrate 62. However, Chen discloses a reflector 30 underneath the fluorescent layer 50 (Chen fig. 3). Chen teaches the reflector 30 directs the light to reach the fluorescent layer 50 (Chen col. 2, lines 63-67). Lowery and Chen have substantially the same environment of LED having phosphor layer with a reflector. Therefore, it would have been obvious for the one with ordinary skill in the art to modify Lowery's device with the teaching of Chen to provide a reflector in order to direct the light to reach the phosphor layer. The reflector layer would be flat (planar shape) on the substrate 62.

With regard to claim 7, Lowery discloses the fluorescent layer 66 is hemispherical shape, but does not disclose reflector within the fluorescent layer 66 is substantially an ellipsoid. However, the changes in shape of the product are held to have been obvious for a person of ordinary skill in the art. In re Daily 149 USPQ 47, 50 (CCPA 1966). See also Glue Co. v. Upton 97 US 3, 24 (USSC 1878). Thus, it would have been obvious the fluorescent layer 66 could be a ellipsoidal sphere and the non-planar reflector could also be ellipsoidal shape.

Claims 11-12, 14-19, and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lowery (US 5,959,316) in view of Takahashi (US 6,717,348).

With regard to claim 11, Lowery does not disclose the layer of phosphor material is segmented into distinct color regions. However, Takahashi discloses a phosphor layer 80 having phosphor dots 81, 82, and 83 (Takahashi col. 5, lines 36-38 and fig. 3). Takahashi discloses the phosphor dots are used for each pixel to form a full-color display (Takahashi col. 5, lines 28-45). Lowery and Takahashi have substantially the same environment of a LED having a phosphor layer to convert the wavelength of the emitted light. Therefore, it would have been obvious at the time the invention was made to modify Lowery's device with the teaching of Takahashi to provide the phosphor dots in order to form a full-color display.

With regard to claim 12, Lowery modified by Takahashi would disclose the layer of phosphor material 80 is co-planar with the LED 50 (fig. 3).

With regard to claims 14-16, Lowery modified by Takahashi would disclose the layer of phosphor material 80 is a discontinuous layer of patterned phosphor dots (Takahashi col. 5, lines 40-43 and fig. 3).

With regard to claim 17, Lowery modified by Takahashi do not disclose the area of the phosphor dots. The size of the phosphor dots is considered to involve routine optimization, which has been held to be within the level of ordinary skill in the art. As noted in *In re Aller*, the selection of reaction parameters such as temperature concentration, thickness, and area etc. would have been obvious:

“Normally, it is to be expected that a change in temperature, or in thickness, or in time, would be an unpatentable modification. Under some circumstances, however, changes such as these may impart patentability to a process if the particular ranges claimed produce a new and unexpected result which is different in kind and not merely degree from the results of the prior art...such ranges are termed “critical ranges and the applicant has the burden of proving such criticality.... More particularly, where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation.”

*In re Aller* 105 USPQ233, 255 (CCPA 1955). See also *In re Waite* 77 USPQ 586 (CCPA 1948); *In re Scherl* 70 USPQ 204 (CCPA 1946); *In re Irmscher* 66 USPQ 314 (CCPA 1945); *In re Norman* 66 USPQ 308 (CCPA 1945); *In re Swenson* 56 USPQ 372 (CCPA 1942); *In re Sola* 25 USPQ 433 (CCPA 1935); *In re Dreyfus* 24 USPQ 52 (CCPA 1934).

Therefore, one of ordinary skill in the requisite art at the time the invention was made would have used any sizes suitable to the method of the process in order to optimize the design.

With regard to claims 18-19 and 21, Lowery modified by Takahashi would disclose the plurality of phosphor dots comprise phosphor material that emits more than one color (such as

Art Unit: 2814

red, green, and blue) when illuminated with the excitation light and each light emitted different wavelengths (Takahashi col. 5, lines 28-35).

Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lowery (US 5,959,316) in view of Steklenski et al. (US 6,652,996).

With regard to claim 20, Lowery do not disclose the reflector comprises alternating layers of a first and second thermoplastic polymer where at least some of the layers are birefringent. However, Steklenski et al. disclose a multi-layer polymeric reflector having birefringent alternating layers (Steklenski col. 10, lines 1-8). Steklenski et al. teach the polymeric multi-layer reflector provides uniform reflection across visible wavelength as well as ultraviolet and infrared regions (Steklenski col. 8, lines 30-41). Lowery and Steklenski et al. have substantially the same environment of phosphor layer having a reflector. Therefore, it would have been obvious for the one with ordinary skill in the art to modify Lowery's device with the teaching of Steklenski et al. to provide a polymeric multi-layer reflector in order to provide a uniform reflection across visible wavelength.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Wai-Sing Louie whose telephone number is (571) 272-1709. The examiner can normally be reached on 7:30 AM to 4:00 PM.



Art Unit: 2814

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on (571) 272-1705. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Wsl

April 29, 2005.

